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ABSTRACT

The purpose of this paper was to examine whether a pediatrician in well child care could promote mother-child interaction in the infant's first 6 months of life, and whether this intervention could affect the infant's cognitive development. Thirty-two mothers and their healthy, first born infants were followed by one pediatrician at 2, 4, 8, 15 and 27 weeks of age. These dyads were randomly assigned to a control group, who received customary care, or to an intervention group, who also received guidance based on the infant's developmental status at each age. Prior to a 27-week visit, the mother-infant relationship was assessed by a person blind to the group assignment. At the same time, infant development was assessed with the Bayley Mental Scale of Infant Development and two of the Uzgiris-Hunt Ordinal Scales. No differences were found on the Bayley M.D.I. or the Object Permanence Scale, but experimental infants were more advanced than control infants on the Vocal Imitation Scale. The intervention group mothers were rated significantly higher than control group mothers on sensitivity, cooperation, appropriateness of interaction, and appropriateness of play. It was concluded that this intervention was effective with both the mother-infant relationship and infant development. (Author/MP)

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EFFECT OF PEDIATRIC WELL CHILD CARE ON THE MOTHER-INFANT RELATIONSHIP AND INFANT COGNITIVE DEVELOPMENT.

Patrick H. Casey, J. Kenneth Whitt.

Experience with infant education programs has shown that the family is the most effective and economical system for fostering the child's development; the earlier such interventions are begun and the longer they are continued, the greater the benefit to the child.[1] The pediatric clinician during well child care has the most generally accepted access to the infant and family. Still, despite data suggesting that the physician has more influence on parent behavior than any source outside the family,[2] the necessity of pediatric well child care as currently practiced has been questioned.[3] Can well child care be utilized to expand the role of the pediatrician beyond physical preventive care to that of promoting cognitive and social competence?

The child development literature suggests an association between the early mother-infant relationship, such as maternal sensitivity and responsiveness to the infant, and the child's later intellectual and social performance.[4-7] For example, a cross-sectional study of 36 mother-infant pairs at 9-18 months of age found that infant cognitive, language, and social development was strongly and positively related to maternal stimulation, responsiveness, and positive emotion.[8] This research suggests that the mother-child relation is an important short-term outcome for well child care, and that the pediatrician may best promote the infants' long-term cognitive and social competence by enhancing the mother-infant interaction. The present study was therefore undertaken to answer two questions: (1) Can a pediatrician in well child care promote the mother-child interaction in the infants first six months of life? (2) Will this intervention affect the cognitive development of the infants at six months of age?

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Methods

A group of normal mothers and their healthy first born infants were recruited for this study within three days of delivery. They were followed clinically by a

single pediatrician at 2 weeks, 4 weeks, 8 weeks, 15 weeks, 21 weeks and 27 weeks of age in well child care.

----------SLIDE 1----------

Nursery infants were excluded whenever chart review revealed: five minute APGAR score less than seven; gestation period less than thirty-seven weeks; birthweight less than 2,500 grams; significant congenital anomalies; or presence of systemic disease. Mothers included those who: were primiparous; exceeded sixteen years of age; had family income less than $15,000 per year; resided in the surrounding five county areas; planned to provide the primary care of the infant; and had no identified source of medical care.

----------SLIDE 2----------

During a six month period, 59 of 543 mother-infant pairs met these recruitment criteria, and 47 (80%) agreed to be followed for well child care. Three of these never came for a visit, leaving 44 mother-infant pairs for study.

Following hospital discharge, the mother-infant pairs were stratified by maternal education and randomly assigned to experimental and control groups. Infants in both groups received physical care consistent with the American Academy of Pediatrics' 1972 standards of preventive health care in terms of number and content of visits. The control group received thorough physical examinations and discussions of physical and preventive care such as accident prevention and nutrition. The mothers in the experimental group received discussions at all visits designed to enhance the affective interaction between mother and infant. These discussions occurred concomitant with and in place of certain aspects of the physical examination.

----------SLIDE 3----------

The objectives of these age-appropriate interventions were as follows: to improve the mothers' understanding of normal infant development, and the individuality of their infants; to promote the mothers' awareness of infant social behaviors; to encourage maternal responsiveness to these social behaviors; and to promote the mothers'

feeling of confidence and competence to affect her infant's development.

----------SLIDE 4----------

To accomplish these goals, the pediatrician discussed with the mothers the normal developmental sequences of infant behaviors in a social context. For example, infant crying at the 2 week and 4 week visit, and infant vocalization at the 15 week visit were presented as infant efforts at social communication. Normal variation in these individual behaviors was discussed, and appropriate maternal responses to these behaviors, as gleaned from the literature, was recommended. Physician modelling (e. g. maintaining eye contact, soothing crying, or vocalizing in response to infant vocalization) was utilized when appropriate.

----------SLIDE 2 (again)----------

The duration of clinic visits for the two study groups was not different, and lasted 25-30 minutes. Of the 44 mother-infant pairs who were randomly allocated, 10 dropped out after the first visit, six from the experimental group and four from the control group. Two others moved from the area after the 15 week visit.

An assistant blind to group status assessed the mother-infant relationship based on two hours of contact with the pair, including lab and testing time, just prior to the twenty-seven week physician visit. The mother and infant were observed through a two-way mirror for 21 minutes in a naturalistic "living room" setting which allowed for a variety of solitary or interactive activities. The mothers were instructed that we were interested in observing the infant at play, and that they could do as they pleased. The rating instruments consisted of 8 individual scales selected as empirically established measures of relevant aspects of the mother-infant relationship. These scales were entitled Cooperation, Sensitivity, Accessibility, Interaction Offered, Interaction Appropriateness, Visual Contact, Vocal Contact and Appropriateness of Play. Each scale had nine point dimensions; the anchor points of 9, 7, 5, 3 and 1 were behaviorally defined in detail. Reliability data for these scales have been published and exceed .85.[9,10]

Infant development was assessed at the same 27 week visit by the Bayley Mental Scale of Infant Development, and the Object Permanence and Vocal Imitation scales of the Ordinal Scales of Psychological Development.[11]

Results

There were no statistically significant differences between the groups in any of the infant or maternal independent variables - such as socioeconomic status, marital status, maternal age, or infant sex - which might have been related to the outcomes of interest.

----------SLIDE 5----------

This slide compares the experimental group and the control group on the rating scales of the mother-infant relationship. Again, these scales consisted of 9 behaviorally defined points, and the rater was blind to group assignment. Appropriateness of interaction, cooperation, appropriateness of play, and sensitivity all significantly favored the mothers who had the pediatric intervention. The remainder of the scales. all strongly favored the experimental group although they did not reach traditional statistical significance.

----------SLIDE 6----------

This slide compares the development of the experimental and control infants. While no group differences were found on the Bayley Mental Scale of Infant Development or the Object Permanence Scale, the infants in the experimental group were more advanced in vocal imitation, significant to the .08 level.

Discussion

Research has shown that the affective quality of the mother-child relationship, i.e. the responsiveness and appropriateness of interaction, is just as important to the child's development as the quantity of stimulation. The rating scales we utilized were chosen as face-valid and reliable measures of these various affective aspects of the mother-child relationship, and they allowed us to measure differences between the mother child relationship in this lab setting.

Tests of infant development which provide developmental quotient scores, of which the Bayley is the best standardized and most commonly used, have not found differences in infants in intervention programs prior to 15 months of age.[12] The results of the Bayley test in this study is compatible with previous experience, and demonstrates the normal performance of the infants in all groups. The Ordinal Scales of Psychological development are thought to be particularly sensitive to differences in various aspects of infant development which result from different child-rearing environments. Since the experimental group infants were more advanced on the vocal imitation scales, and since a major focus of our intervention consisted of encouraging maternal sensitivity and verbal responsiveness to infant vocalizations, a relationship is suggested between the pediatric intervention, maternal behavior, and advanced infant vocal behavior.

In order to control for the potential beneficial effects of the frequent visits with the same pediatrician, a third group of 12 mother-infant pairs was also evaluated at 27 weeks of age. This group, which received well child care from other pediatricians in the primary care setting, was recruited by mail and represented 35% of the total mailing. This comparison group was selected from the same birth cohort and met the same selection criteria as the other groups. They were not invited to participate in the full study either because they did not live in the surrounding five counties, or because their charts were not reviewed due to holidays or weekends. Although these results are liable to a variety of selection biases due to lack of random allocation, comparison of the experimental group with this group yielded results similar to the control group. All of the ratings of the mother-child relationship favored the experimental group, and Sensitivity and Appropriateness of Interaction were statistically significant. The infants were not different on the Bayley, but the experimental infants were significantly advanced on the vocal imitation scale, with probability $< .01$.

In summary, this randomized clinical trial with healthy primiparous mother-infant pairs demonstrated that a brief pediatric-intervention during well child care was effective in changing the relationship of these mothers and their infants in the first six months of life, as well as one aspect of infant development. Although the generalizability of these results is limited because of the stringent recruitment criteria, these findings offer empirical support for a more biosocial approach to routine pediatric child care.

Slide 1

Recruitment Criteria

Infant exclusion:

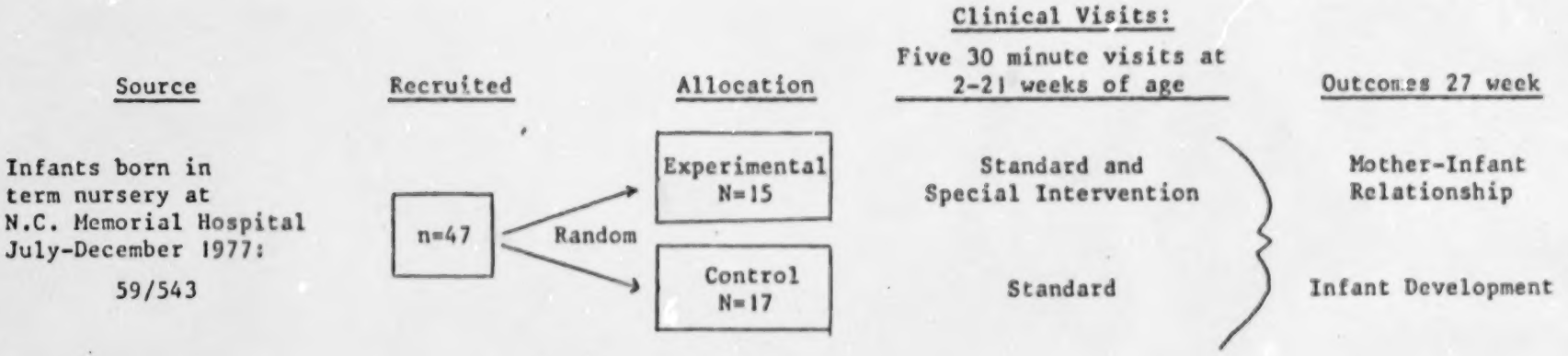
(1) 5 minute APGAR < 7
(2) gestation age < 37 weeks
(3) birthweight $< 2,500$ grams
(4) born with significant congenital anomaly
(5) presence of Systemic Disease

Mother inclusion:

(1) primiparous
(2) age ≥ 17 years
(3) income $< \$15,000$
(4) reside in surrounding 5 county area
(5) planned to provide care of the infant
(6) no identified source of medical care

Slide 2

STUDY DESIGN



Slide 3

General Goals of Pediatric Intervention

(1) Improve understanding of normal infant development

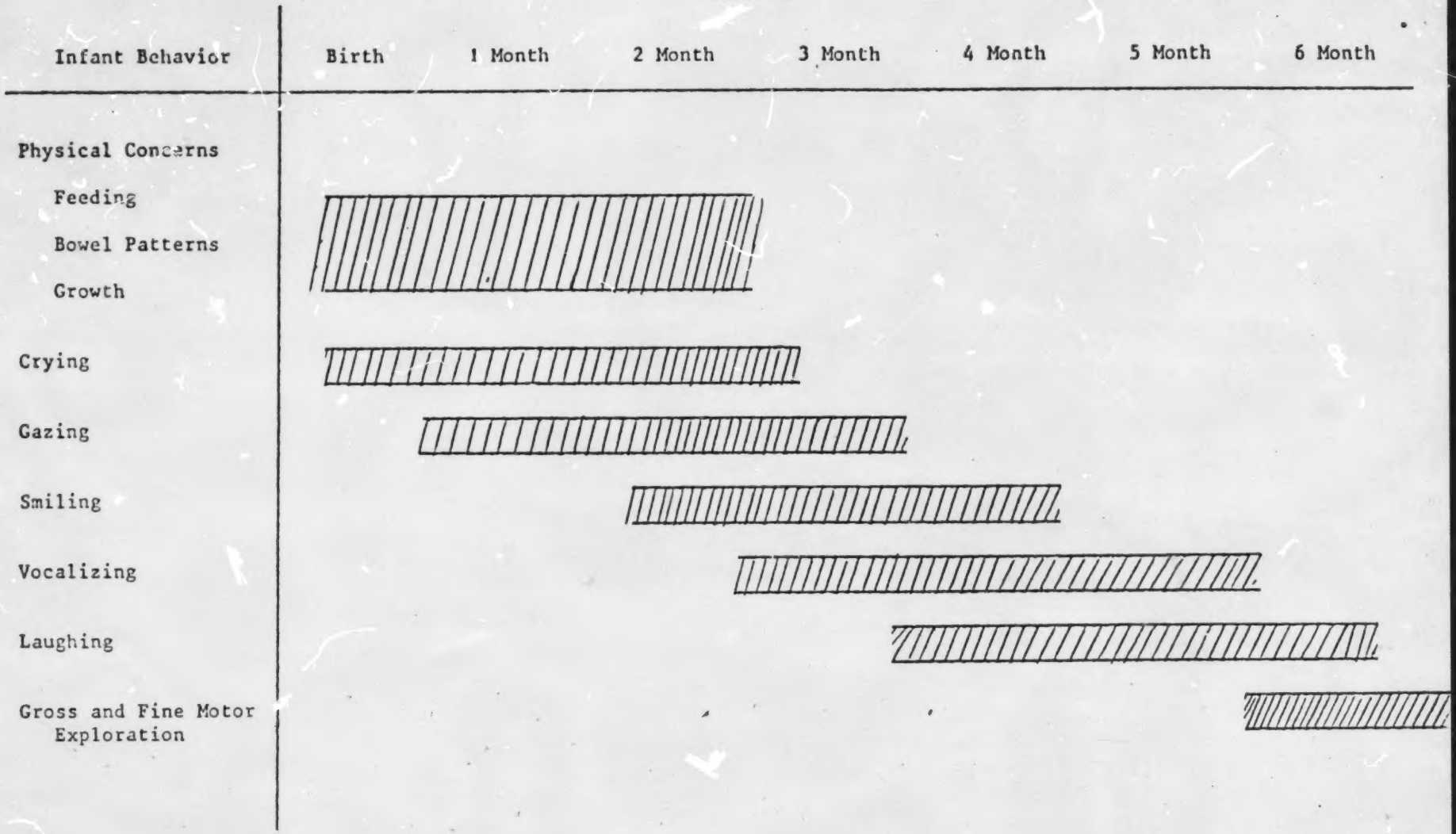
(2) Improve understanding of the individuality of the specific infant

(3) Promote awareness of infant social behaviors

(4) Promote responsiveness to these infant social behaviors

(5) Promote feelings of competence and confidence to affect infant development

Slide 4


Infant Behavior
Birth
1 Month
2 Month
3 Month
4 Month
5 Month
6 Month
Physical Concerns
Feeding
Bowel Patterns
Growth
Crying
Gazing
Smiling
Vocalizing
Laughing
Gross and Fine Motor Exploration

Slide 5

Rating Scales of Mother-Infant Relationship

	Intervention Group (n=15) $\bar{x}$	Control Group (n=17) $\bar{x}$	P Level*
Interaction Appropriateness	7.06	5.05	0.008
Cooperation	6.93	5.29	0.005
Appropriateness of Play	7.35	6.0	0.025
Sensitivity	7.46	6.23	0.04
Accessibility	8.26	7.29	0.07
Auditory Contact	7.0	5.88	0.07
Interaction Offered	7.33	6.17	0.08
Visual Contact	8.33	7.76	0.1

*t-test, one-tailed

Slide 5

Mean Scores of Developmental Tests

	Intervention Group (n=15) $\bar{x}$	Control Group (n=17) $\bar{x}$	P Level*
Bayley M.D.I.	111.8	109.2	0.29
Object Permanence	3.53	3.47	0.42
Vocal Imitation	2.[illegible]	2.41	0.08

*t-test, one-tailed

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